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PAPERS

IN

POLITE ARTS.

Twenty GUINEAS, *were this Session voted to Mr.* PETER NICHOLSON, *No.* 10, *Oxford Street, for an Instrument called a Centro-linead, useful for drawing in Perspective; the following communication was received from him, an explanatory Engraving is annexed, and the Instrument is preserved in the Society's Repository.*

SIR,

I BEG leave to send, for the consideration of the Society for Encouragement of Arts, &c. an instrument of my invention, called a Centro-linead, for drawing lines to inaccessible vanishing points in perspective, an operation in general very troublesome to perform, especially where the distance of such points from the drawing exceeds the distance of the walls of the apartment, and even in offices, where the distance is only ten or twelve feet, it will be found in its application more easy to handle, to require less attention, and to perform with greater facility than a heavy rule of the same length, which takes up the whole of the room, thus only admitting one person to draw at a time. Having experienced its efficacy in my own line of business, (that of teaching Architecture and Perspective) for more than twelve months past, I can speak with confidence of its performance.

The idea of the invention occurred to me more than twenty years ago, when I had a model made sufficient to explain its properties, though not sufficiently accurate for use. If the Society should think it deserving their approbation, any reward they may think fit to bestow will be gratefully received, by,

Sir,

Your most obedient Servant,

PETER NICHOLSON.

No, 10, Oxford Street,
April 13, 1814.

To C. Taylor, M. D. Sec.

Description of the Centro-linead. See Plate 2, Fig. 1, 2, 3.

In fig. 1, let A B and C D be two bars so regulated by the following contrivance, that the straight edge C D of the bar C D in motion may always cut a straight line A B, passing through the middle of the bar A B at rest. For this purpose let E and F be two points in the line A B, and let E I and F K be two other bars, so that the lines F K and E I passing longitudinally through their middle may be parallel: H G is another bar of which a line H G passing through the middle is parallel to the line E F passing through the middle of the bar A B; then E F G H will be a parallelogram: Now let the points I and K be in the line C D; then suppose E to be a fixed point in the bars A B and E I; F a fixed point in the bars A B and F K; G a fixed point in the bars F K and G H; H a fixed point in the bars E I and G H; I a fixed point in the bars E I and C D; and K a fixed point in the bar F K, but not in the bar C D; suppose the bar A B fixed, and the other parts put in motion according to this construction, the points I and K will describe similar arcs, and the bar C D will always cut the line through the middle of A B at the same distance from either of the points E or F.

In order to effect this motion, P Q is a groove parallel to the right edge C D; N O is a slider: K is a point common to the slider N O and to the bar F K, so that when the instrument is in motion the point K will always be in the edge C D.

The bar F K is so contrived that it may be lengthened or shortened to certain limits, so as to make the vanishing point on the one side or the other as may be required, in the following manner:

The bar F K is made double. The lower part F G is fixed to A B and G H, and the upper part L K has a longitudinal slit to slide upon a pin G passing through the bars G H and F G. In the line F K at M is another pin, in order to keep the middle of the slit in the straight line F K and to fix or unfix the two parts of L K and F G at pleasure.

To shew the truth of what has been asserted, let A B and C D, fig. 2, be the two bars of which A B is fixed; then if C D be moved according to the preceding regulation,

tion, the line C D will always pass through the same points in the line A B produced.

For though I draw I R parallel to A B, so that E F R I will be a parallelogram: then because of the similar triangles K R I and I E S, K R, : R I : : I E : E S; but since I R, R I, I E, are given lengths, the fourth proportioned E S will therefore be invariable, whatever the angles of the instrument makes in its revolution.

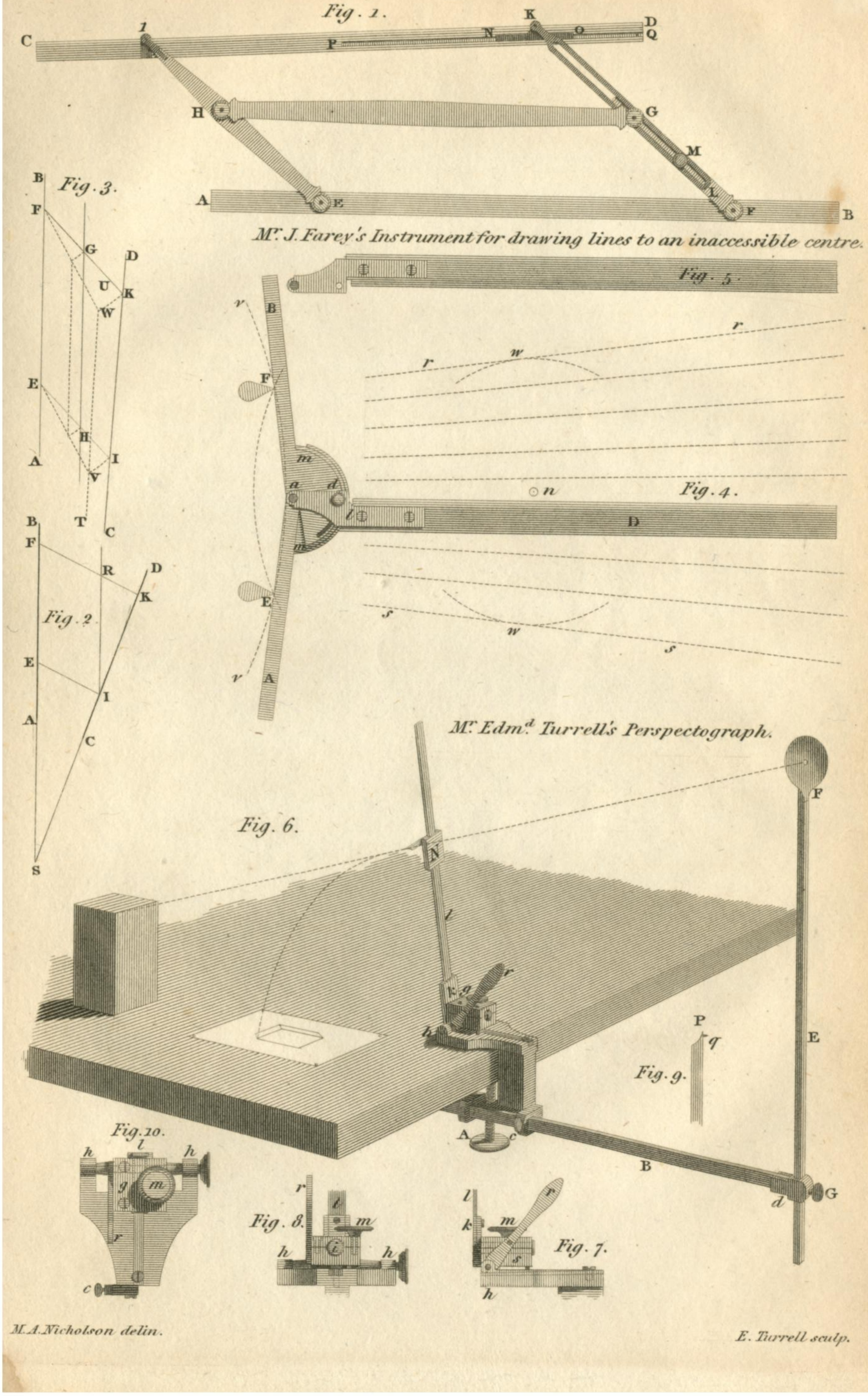
To set the instrument so as to tend to the same point in which if two straight lines A B and T U, fig. 3, would meet if produced lay the edge of the instrument A B upon the straight line A B, then suppose the parts of the diagram.as expressed by the similar letters to those in fig. 1, to be the elements of the instrument, the middle of the bar A B be laid upon A B; move the other parts so that the point I may meet the line T U in V, unscrew the nut of the lengthening and contracting bar FK, and revolve the line C D round I, which is fixed so that I D may fall upon V U, then screw the nut tight, and the instrument will be set as required.

Note—There must always be an index or line on the fixed bar A B so as to set it to a given point in the vanishing or other line, and that the instrument may be removed when necessary, and set to its place again with the same accuracy as before.

Mr. P. Nicholson's Centro-linead.

Mr. J. Farey's Instrument for drawing lines to an inaccessible centre.

Mr. Edmd. Turrell's Perspectograph.



M. A. Nicholson delin.

E. Turrell sculp.

The SILVER MEDAL *was this Session voted to Mr.* J. FAREY, *Jun. Crown Street, Westminster, for an Instrument useful in Perspective drawings. The following Communication was received from him, an explanantory Engraving is annexed, and the Instrument is preserved in the Society's Repository.*

SIR,

WITH this you will receive an instrument of my invention for drawing lines converging to a distant point. This I have found extremely useful in making perspective drawings, as it gives an artist the means of making a drawing upon a board or table of moderate dimensions though the vanishing points fall at ever so great a distance; for the instrument is quite general in its properties, being capable of drawing parallel lines, which may therefore be considered as converging to a point at an infinite distance, or it may in a moment be altered to draw to a point within a few inches distance. I shall be obliged to you to communicate this to the Society.

The first instrument of this kind, I made in the year 1807, and I have had it in constant use ever since, as it applies with advantage to almost every perspective drawing; I have been induced to present it to the Society, at the request of several members to whom I have shewn it, but in so doing I do not wish in any degree to deduct from the credit due to Mr. Peter Nicholson, for his ingenious instrument, called the centro-linead, and intended for the same purpose. As an invention, mine is by no means to be compared with his, which is founded on a geometrical principal that I believe is new, and has been carried into execution in a very complete manner: mine is merely an application of a well known principle to the purpose I wanted; but having in several years use found it a very valuable acquisition, I wish to make it known to other artists through the medium of the Society; the simplicity and cheapness of this instrument will, in some cases, give it a preference to the centro-linead, particularly where a picture requires to have two or three of the instruments in use at once, for as many differing vanishing points which fall beyond the limits of the drawing-board. I have very frequently used two at once, without any inconvenience, because it has no attachment to the drawing board, and may therefore be removed in an instant to apply any other rules, &c. which the drawing requires.

It may be used indifferently to draw to a point, either on the right or left side. To set against these advantages, it is not so readily adjusted to the direction required, as Mr. Nicholson's, but when once done, is not liable to be deranged.

I remain, Dear Sir,
Yours truly,
J. FAREY, Jun.

12, Crown Street, Westminster,
April 18th, 1814.

To C. Taylor, M. D. Sec.

Reference to the Engraving of Mr. Farey's *Instrument for drawing Lines to an inaccessible center. Plate* 2, *fig.* 4, 5.

This instrument acts upon the drawing board, or table, on which the paper is fastened, with as much facility and as little attention as a T square does, when drawing parallel lines, and will be found extremely useful to those who draw buildings, &c. in perspective, as the points to which the lines for such drawings should converge, will often fall at a distance of 12 and 15 feet from the picture, so as to render it impracticable to employ rulers of sufficient length to reach the points, and there is, except this instrument and Mr. Nicholson's lately invented, no other practicable method of drawing such lines.

The instrument consists of three rulers, A B and D, fig. 4, which are united by a common centre-screw *a*, and have a thumb screw *d*, which fixes them fast at any angle at which they may be placed; EF are two fixed weights, or rests, against the edges of which the rulers A B are applied, when the instrument is used; or pins fixed into the table will answer the same end very conveniently. By sliding the instrument against these stationary points, as shewn in the figures, the ruler D will draw converging lines, as shewn by the dotted lines, which all converge to a common center, the distance of which will depend upon the angle of the ruler A B, and the situation of the points EF; the edge of the ruler D, must in all cases be made to bisect, the angle formed between the other two, otherwise the lines which it draws, will not converge to a common center, but will form tangent to a circle, of small radius, described round the intended center point; this indeed is a case which geometricians may sometimes find useful, but for artists, who require the lines to converge to one point, the thin edge of D must bisect the angle formed between A and B. The manner of setting the instrument for any particular case, is thus:—Suppose we have given the two extreme lines *r w r* and *s w s* (dotted) which converge to the intended point; suppose it is required to draw a number of others to the same point, the pins or weights E F, must be set upon these lines, but at equal distances from the center or point where the lines could intersect to find the situation proper for these points, place the leg of a pair of compasses upon some point situated between the two lines, *r s*, and find experimentally by repeated trials, that when a circle (as shewn at *w w*) is described by the other point of the compasses, the two lines *r s*, will form tangents to it, from this point, which suppose at *n*, with a sufficient opening of the compasses, mark off two points as at E F, by striking an arch E F across the lines, and these will be equidistant from the center. The pins being placed in these points, apply the instrument to them, with the clamp screw *d* loose, then slide the rulers A B against the pins, till the ruler D comes to one of the lines, as *r*, and here incline the rulers on their center points, till the edge of D corresponds with it, when A is in contact with the pins, now remove it till the ruler D matches with *r*, and there make a similar adjustment, that B will touch the pins. The clamp screw being now fastened, fix the rulers as they are adjusted; and then on sliding the two rulers A and B against the pins E F, the edge of the third ruler D, will in all positions tend to the same center point as the lines *r r* and *s s*; the angle or point *o*, in which the rulers A B meet, will, in the motion of the instrument describe a segment of a circle, as shewn by the dotted line *v* E *a* F *v*, and the center to which the lines tend is a point in the opposite circumference of that circle. This point will be found by bisecting the distance E F upon the dotted arch, and from this point, drawing a line through the center of the circle *v* E *a* F *v* till it cuts the opposite circumference, and to this point the lines will converge.

If the instrument is required to have a greater range, or to draw more convergent lines than between F *r* and E *s*, other pins must be fixed for its rulers to act against; taking care, that they are placed at the same distance from E or F as these are from each other. Their proper situation will be determined, by the rulers A B themselves; thus, by sliding the rulers against the pins, till the angle between them comes to one of the points E or F, the new point must be placed so as to be in contact with the edge of that ruler which overhangs the pins, and at the same distance from the present pins E or F, as it is between them.

The construction of the instrument is apparent, from inspection of the figure, the two rulers A B, have circular parts *m* behind the center, which apply one upon the other, and a projecting part *l* from the ruler D lies over both; the center screw *a* passing through all three; an arched grove is cut through both the circular parts *m m*, to admit the screw *d*, which also passes through *l*, and thus fastens them all three together, by screwing into a nut, fitted into the arched groove, of the lower one; the ruler D is made of wood or ivory, as shewn separate in fig. 5, and screwed to the underside of *l*, so that it comes into the same plane with A and B. The instrument will draw parallel lines like a T square, when A B are set in a straight line, and if the circular part *m* is graduated, it will make a protractor, to set out angles; fig. 5, is an extra-ruler, to be applied in lieu of D, when the instrument is required to draw lines to a center, on the opposite side; it is merely reversed to the other, having the hole in *l*, which is for the center screw *a* in the line

of

of the opposite edge, to that which is shewn in use in fig. 4, one being intended to draw lines tending towards the left hand side, and the other towards the right hand side.

The SILVER MEDAL *was this Session voted to Mr.* EDMUND TURRELL, *of Gee Street, Clarendon Square, Somers Town, for his Invention of a Perspectograph, or Instrument for Drawing Objects in Perspective. The following Communication was received from him, an explanatory Engraving is annexed, and the Instrument preserved in the Society's Repository.*

GENTLEMEN,

IN examining the various contrivances that have been invented for the purpose of making perspective drawings by mechanical apparatus, scarcely any that I know of have been brought into general use, although most persons in the habit of making such drawings have expressed a wish that some contrivance might be found possessing simplicity in its form, moderate in its expense, and so small in bulk, that an artist might conveniently carry it to the objects of delineation.

One of the most simple, and perhaps the best contrivance that I know of, is described in a work on perspective by Ferguson; this is composed of a brass frame fixed upon hinges, which enables the artist to lift it up and lay it down when the perspective point is obtained. The mode of getting the point is by the intersection of two wires or fine threads, which may be made to cross each other within any part of the frame, but as these must frequently have to cross each other at very acute angles, the precise point must be very difficult to obtain. Besides this objection, the instrument, from the nature of its construction, must of necessity be fixed to a board, which, added to the frame, would render this no very portable object. These were the considerations which gave rise to the one which I have the honour to present, and I trust that when the great number of persons are considered who can draw plans and elevations with neatness aud accuracy, but who have no knowledge of the rules of perspective, nor inclination to pass through a series of mathematical problems to attain a proficiency therein, sufficient to enable them to draw even a simple piece of machinery perfect, it renders the invention of such an instrument exceedingly desirable, at a time too like the present, when the knowledge of science is so widely diffued, and is still susceptible of considerable improvement, if accuracy of depicted representation keeps pace with correctly written information.

The principal objection to all instruments that find the perspective points, or extremes of lines, is the length of time that is necessary for conducting the operation. But let an artist who has all the advantages arising from practical habits of drawing, sit down to delineate a machine (or any object that may be chosen,) and let a person in the habit of using such an instrument as the present, begin with the same subject at the same time, and tedious as the operation of finding points may appear, I should have no fear but the result would prove in favour of the instrument; at the same time, the superior accuracy produced by it, would appear evident.

I believe it will not be denied, that there are many respectable artists, who have a knowledge of perspective sufficient to answer most cases in architectural and picturesque delineation, that would greatly object to draw a complex piece of machinery in perspective, there being such a degree of accuracy required in this branch of art, and so many rules to put in practice to obtain perhaps only a few lines or points, that it requires the aid of some mechanical invention to abridge the labour and ensure the accuracy of the operation.

It is not in Machinery alone that such a rigid degree of accuracy is requisite; scientific subjects in general require it to be continually exercised. By way of example, I have two models of crystals, and perspective drawings of them done with the instrument, such as appear to me most difficult to represent by the common rules of perspective. These subjects are frequently occurring in the science of mineralogy, and present to an artist one of the most difficult tasks in the practice of perspective; but by the application of the instrument, they are rendered comparatively easy, even to those unaccustomed to perspective delineation. I shall now proceed to describe the construction of the instrument, and the manner of using it.

The principal part of this instrument consists of a steel rod having a small slider, which is capable of moving up and down upon it freely, but remains stationary by the pressure of two small springs acting on the rod. This slider carries a projecting piece of steel, having a small point bent at right angles at its extremity. One end of the rod is screwed fast to an axis, which turns in a brass joint, which has an adjustment for tightening it, so that the rod may be kept in any position.

The brass joint moves on an axis perpendicular to the one attached to the steel rod: this axis serves to unite the apparatus to a clamp, which may be fixed to any table or board by a thumbscrew. To the side of the clamp, two small loops are fixed, through which a steel bar slides carrying the eye piece, which may he fixed at any distance, and retained by a tightening screw in the loop; the eye piece may also be elevated or depressed at pleasure, and kept at any height that may be desired by a small thumbscrew.

When the instrument is to be used, the clamp must be screwed tight to a board or table, and the paper upon which the drawing is to be made, must be laid down close to the clamp, and fixed firmly with a few bits of soft wax. The pin or axis upon which the brass joint turns is then to be pressed firmly through the holes in the clamp, and the steel rod which has the slider upon it will stand perpendicular to the table by the pressure of the spring under it, similar to the joint .of a clasp knife. This rod may now be moved from the right hand to the left, generating by its motion an imaginary semicircular plane, which is to be considered as the plane of the picture; by the union of this motion, and that of the slider upon the bar, the steel point may be brought to any given position in the plane of the picture.

The theory upon which this instrument is formed being understood, the practice will consist in placing the object to be drawn at a convenient distance from the supposed plane of the picture, and having fixed upon the height at which the eye of the spectator shall view the object, next determine the distance the picture shall be from the eye, (or, as it is frequently called, the point of sight). This being done, the eye of the artist must be applied to the hole in the eye-piece, and the steel point be brought to coincide with the extreme point of any line in the object to be drawn. Having performed this part of the operation with great exactness, the rod may be turned down by moving the brass piece upon its axis (using for this purpose the small handle) until the steel point comes in contact with the paper, when the fore-finger must be pressed upon it till the bent point enters it sufficiently to make a visible puncture, which is the perspective representation of one extreme point of the given line. The same operation is to be repeated to obtain the other, and the two points being joined by a line, it will be the perspective representation of the original line in the object to be drawn.

When curved lines are the objects of delineation, any number of points may be obtained in them by the instrument, which being transmitted to the paper, and carefully drawn through with a steady hand and a fine pencil, the perspective representation of curved objects may be obtained with great ease.

I trust it will be unnecessary for me to say any thing further, as the great number of experienced artists and men of science who constitute the body of your Honorable Society, leave no doubt in my mind, that if any merit should be found in this invention, it will be duly appreciated,

I am, Gentlemen,

Your most obedient, Humble Servant,

E. TURRELL.

No. 4, Gee St., Clarendon Sq. Somers Town.

To the Society for the Encouragement of Arts, &c.

Reference to the Drawing of Mr. Edward Turrell's Perspectograph. Plate 2, Figs. 6, 7, 8. 9, & 10.

The foundation of this Instrument is a brass clamp, see Plate 2, fig. 6, having a screw at A to fix it to a table, drawing-board, &c.; to the lower part of this clamp two loops are attached, in which the bar B slides, and may be kept at any distance within its range by the binding screw *c*; the bar B has a loop fixed on one end, as shewn at *d*, to receive a rod E, at the end of which is placed the sight-piece F; this rod may be retained at any height by the screw G.

To the upper part of the clamp two ears are attached, one of which is seen at *h*; between these the block *g* moves on an axis or taper pin, the end of which is seen coming through the ear at *h*; the block *g* has an axis passing through it a little above, and exactly at a right angle to the taper pin before mentioned; the one end is seen at *i*, fig. 8, and from the other projects the piece *k* to receive the bar *l*, this bar may be turned from the right-hand to the left, and vice versa, retaining its position at any angle by the friction on the axis, which may be increased at pleasure, as the block which receives it is divided in two, the upper part being pressed upon the axis by a tightening screw, shewn at *m*, fig. 8, which represents an end elevation of the upper part of the clamp.

The slider N, moves freely up or down, the bar *l* retaining itself in any situation by the pressure of two small springs enclosed within it, pressing against the bar.

The bar *l*, which is attached to the block by its axis, is kept in a perpendicular position by a spring pressing under the block, exactly in the same manner as the spring of a clasp-knife presses upon the square tongue or shoulder of the blade. The position and action of this is best seen by dotted lines at *o*, in the side elevation of part of the clamp at fig. 7; *s*, in the same figure, shews the under half of the divided brass block.

The slider N, has a projecting piece formed into a point as shewn at fig. 9, the end P being used to make a coincidence with any part of the object to be drawn, and the point *q*, which stands at right angles to it, is for the purpose of marking the perspective representation of that point upon the drawing, when the bar and slider are laid down upon the paper, and the point pressed upon by the finger, so as to make a small puncture.

The handle *r*, is for the purpose of elevating or depressing the bar and slider when they have been brought to any position desired, and prevent the accidental shifting of the bar, which might occur if the hand of the operator was to touch it in laying it down,

Fig. 10, is a plan of the clamp, the letters the same as referred to in the other figures.

When the instrument is to be prepared for use, the brass block or joint *g* is to be fixed in the ears of the clamp by the axis or pin *h*, upon which it turns. This part of the apparatus is then ready to be screwed to a table, drawing-board, &c. by the thumbscrew A. The paper upon which the drawing is to be made, may be fastened to the drawing-board on one side, by passing it under the clamp before it is screwed to the board or table, and the other sides may be confined by a few wafers, sealing-wax, &c.

The bar *l*, by the pressure of the spring under the brass block or joint, will stand perpendicular to the drawing-board, and may be turned either to the right or left, generating by such motion an imaginary plane, which we have before observed, is to be considered as the plane of the picture.

The slider N, may be moved up or down upon the bar *e*, when it will be seen, that by the union of the two motions, namely of the bar upon its axis *i*, and of the slider N upon the bar *l*, the small point fixed to the slider may be placed any where in the supposed plane of the picture.

The rod B, is to be placed in the loops on the side of the clamp, the eye piece F fixed in it at any height or distance that may be considered most convenient for viewing the object to be drawn, and the instrument is ready for use. The method of obtaining the perspective representation of right lines and curved objects having been before described, it will be unnecessary to repeat it; we have only to observe, that the whole instrument can be packed up in a case 12 inches long, 3 inches wide, and 2½ inches deep.